

1. A method of fabricating at least a portion of a biomedical implant,  
2 comprising the steps of:  
receiving digital data indicative of patient physiology;  
4 constructing a computer-aided design (CAD) file in accordance with the digital  
data;  
6 generating a tool path; and  
fabricating the implant or portion thereof by depositing material increments along  
8 the tool path using direct metal deposition (DMD).

2. The method of claim 1, further including the step of using a closed-loop  
2 DMD process, wherein the size of the increments are controlled through optical  
monitoring.

3. The method of claim 1, wherein the materials include one or more metals  
2 or ceramics.

4. The method of claim 1, wherein the materials include zirconia or alumina.

5. The method of claim 1, further including the step of fabricating the  
2 implant out of different materials using the same DMD process.

6. The method of claim 5, wherein the different materials include metals,

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2 ceramics, or polymers.

7. The method of claim 1, further including the step of embedding one or  
2 more sensors into the implant for diagnostic or data-acquisition purposes.

8. The method of claim 1, further including the step of fabricating a scaffold  
2 structure suitable to bone ingrowth or ongrowth using the DMD process.